

ABSTRACT OF THE DISCLOSURE

A voltage-controlled tunable multilayer filter which comprises a first resonator on a first layer of dielectric material or low-temperature-co fired-ceramic; a second resonator coupled to said first resonator on a second layer of dielectric material or low-temperature-co fired-ceramic; a third resonator located on a third layer of dielectric material or low-temperature-co fired-ceramic coupled to said second resonator and cross coupled to said first resonator; an input transmission line connected to said first resonator; an output transmission line connected with said third resonator; and a variable capacitor in at least one of said resonators. The variable capacitor can comprise a substrate having a low dielectric constant with planar surfaces; a tunable dielectric film on said substrate comprising a low loss tunable dielectric material; a metal electrode with predetermined length, width, and gap distance; and a low loss isolation material used to isolate an outer bias metallic contact and a metallic electrode on the tunable dielectric. This allows the center frequency of the filter to be tuned by changing the variable capacitor capacitance by changing the voltage.